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# Custom-made cancer cell attacks

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Imagine a cancer treatment tailored to the cells in a patient's body, each person receiving a unique treatment program.

This is what Natural Sciences and Engineering Research Council grantee Thomas Ruth and his colleagues hope to accomplish within the next decade. Using the TRIUMF particle accelerator based in Vancouver, British Columbia, they are taking vast amounts of radioactive material and separating the particular atoms they need for therapy.

Ruth says radioisotope therapy is the next big frontier in health care because different types of chemicals can be selected for tailor-made treatment programs. This is because radioactive chemicals such as radioiodine decay in a predictable way and emit radiation while that is happening.

Bearing that principle in mind, researchers can make custom types of radioactive chemicals – or radioisotopes – that will attack cancer cells in a more efficient way than current cancer treatments.

Ruth will discuss his results at the American Association for the Advancement of Science (AAAS) conference in San Francisco, which runs from Feb. 15 to 19.

"Individual therapy means patients will require fewer radiation doses and treatment sessions," says Ruth, who is director of the TRIUMF PET (Positron Emission Tomography) program at the University of British Columbia. "And the patient isn't the only one who benefits. Doctors do

not have to spend as much time treating patients, and hospitals will spend less money helping those patients get better."

The challenge for Ruth and the rest of his team, who use the element rhenium for treatments, is separating the right isotope of rhenium with the accelerator. They buy the most common type from MDS Nordion in Kanata, Ontario, or the University of Missouri Research Reactor Center. At present they are investigating methods to ionize, or break apart, the rhenium. In the next phase of the project, they will use magnets to separate the specific type of rhenium they need – Rhenium 186.

"Right now, getting Rhenium 186 is a difficult and expensive process," says Ruth. "The key is to make this practical for the people who need to use it. In the next few months, we will partner with local hospitals and begin pre-clinical trials – and, in the meantime, improve on the way we extract it to make it easy to purchase and cheap to use."

Source: Natural Sciences and Engineering Research Council